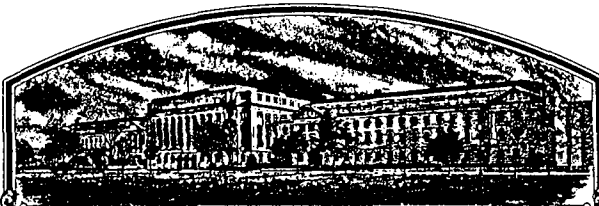


No.

8700089



# THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

## Holden's Foundation Seeds, Inc.

Whereas, THERE HAS BEEN PRESENTED TO THE  
Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF *eighteen* YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT (U.S.C. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

CORN

'LH146Ht'

In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D. C. this 11th day of March in the year of our Lord one thousand nine hundred and eighty-eight.

Attest:

*Kenneth A. Howard*  
Commissioner  
Plant Variety Protection Office  
Agricultural Marketing Service

*Richard E. Lyng*  
Secretary of Agriculture

U.S. DEPARTMENT OF AGRICULTURE  
AGRICULTURAL MARKETING SERVICE

FORM APPROVED: OMB NO. 0581-0055

## APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(Instructions on reverse)

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S) Holden's Foundation Seeds		2. TEMPORARY DESIGNATION Ex813	3. VARIETY NAME LH146Ht
4. ADDRESS (Street and No. or R.F.D. No., City, State, and Zip Code) R.R.#2, P.O.Box 839 Williamsburg, IA 52361		5. PHONE (Include area code) 319-668-1100	FOR OFFICIAL USE ONLY PVPO NUMBER 8700089
6. GENUS AND SPECIES NAME Zea Mays	7. FAMILY NAME (Botanical) Gramineae		FILING DATE March 19, 1987 TIME 1:00 <input type="checkbox"/> A.M. <input checked="" type="checkbox"/> P.M.
8. KIND NAME Corn, Field	9. DATE OF DETERMINATION November 1982		FEES RECEIVED AMOUNT FOR FILING \$ 1800.00 DATE March 19, 1987 AMOUNT FOR CERTIFICATE \$ 200.00 DATE Feb. 17, 1988
10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION (Corporation, partnership, association, etc.) Corporation			12. DATE OF INCORPORATION 1968
11. IF INCORPORATED, GIVE STATE OF INCORPORATION Iowa			
13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS Mr. Mark Armstrong P.O. Box 839 Williamsburg, Iowa 52361 PHONE (Include area code): 319-668-1100			

14. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED

a. ☒ Exhibit A, Origin and Breeding History of the Variety (See Section 52 of the Plant Variety Protection Act.)

b. ☒ Exhibit B, Novelty Statement.

c. ☒ Exhibit C, Objective Description of Variety (Request form from Plant Variety Protection Office.)

d. ☒ Exhibit D, Additional Description of Variety.

e. ☒ Exhibit E, Statement of the Basis of Applicant's Ownership.

15. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? (See Section 83(a) of the Plant Variety Protection Act.) ☐ Yes (If "Yes," answer items 16 and 17 below) ☒ No

16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS? ☐ Yes ☒ No

17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED? ☐ Foundation ☐ Registered ☐ Certified

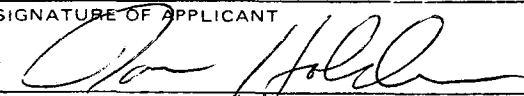
18. DID THE APPLICANT(S) PREVIOUSLY FILE FOR PROTECTION OF THE VARIETY IN THE U.S.? ☐ Yes (If "Yes," give date) ☒ No

19. HAS THE VARIETY BEEN RELEASED, OFFERED FOR SALE, OR MARKETING IN THE U.S. OR OTHER COUNTRIES? ☐ Yes (If "Yes," give names of countries and dates) ☒ No

20. The applicant(s) declare(s) that a viable sample of basic seeds of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.

The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in Section 41, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act.

Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF APPLICANT 	DATE 3/12/87
SIGNATURE OF APPLICANT	DATE 1

## Exhibit A

'LH146Ht' was developed through a pedigreed system of breeding. On the following page is a schematic description of the development of 'LH146Ht'. Also included are copies of pages from Holden's Foundation Seeds nursery books. The rows associated with the development of 'LH146Ht' have been highlighted.

Attached is a statement from the originating plant breeder, Richard Miller, Holden's Foundation Seeds, stating that the line is uniform, stable and free of variance.

## Exhibit A

## Uniformity Statement

I have observed 'LH146Ht' during the last four generations it has been increased, 1983 Iowa nursery rows 10233-10252, 1984 Beason Farm Iowa, 1985 Beason Farm Iowa and 1986 Von Ahsen Farm. In each of these increases seed from the previous generation were planted. The line is very stable, uniform and free of variance from generation to generation.

  
Richard J. Miller  
Plant Breeder

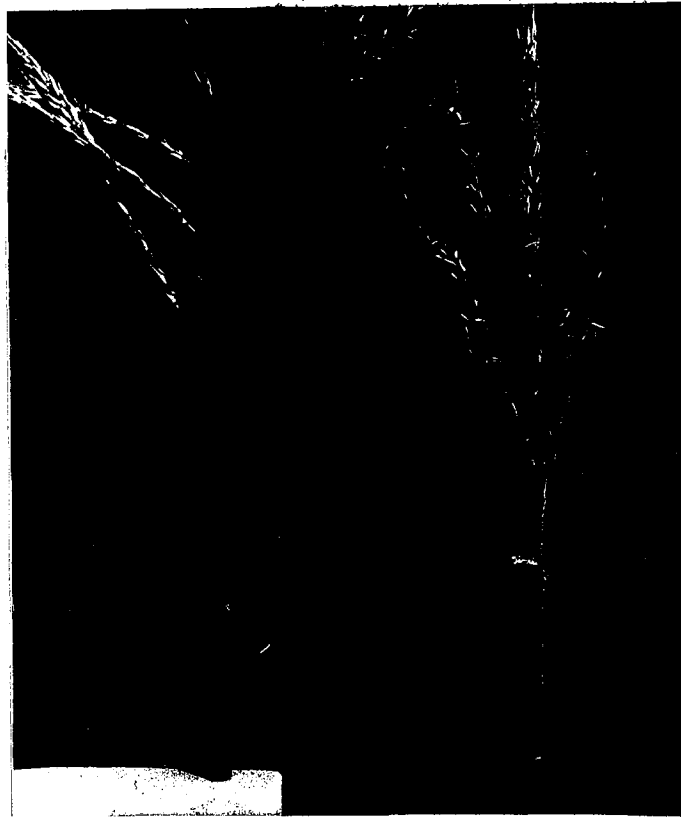
LH146Ht Ex813 B73 x CM105) (CM105

8700089

<u>Row No.</u>	<u>Pedigree</u>	<u>Location</u>	<u>Year</u>
Von Ahsen Farm	LH146Ht	Iowa	1986
Beason Farm	LH146Ht	Iowa	1985
Beason Farm	LH146Ht	Iowa	1984
10233-10252	Ex813	Iowa	1983
2530	B73 x CM105) (CM105 <sup>6</sup>	Iowa	1982
11412	B73 x CM105) (CM105 <sup>5</sup>	Iowa	1981
10692	B73 x CM105) (CM105 <sup>4</sup>	Iowa	1980
4856	B73 x CM105) (CM105 <sup>3</sup>	Hawaii	1980
8506	B73 x CM105) (CM105 <sup>2</sup>	Iowa	1979
8995	B73 x CM105) (CM105	Iowa	1978

## The Novelty Statement

'LH146' most closely resembles 'CM105', however the most distinguishing characteristic is the flag leaf. 'LH146Ht' has a flag leaf that has a leaf angle less than  $30^{\circ}$  while the flag leaf of 'CM105' has a leaf angle greater than  $60^{\circ}$ . This difference can be seen below in the photograph.



Photograph 1

The tassel on the left is 'LH146Ht' and the tassel on the right is 'CM105'. Notice the flag leaf of 'LH146Ht' is erect and almost parallel to the stalk and the flag leaf of 'CM105' is drooping and almost perpendicular to the stalk.

FORM GR-470-28  
(2-15-74)UNITED STATES DEPARTMENT OF AGRICULTURE  
AGRICULTURAL MARKETING SERVICE  
GRAIN DIVISION  
HYATTSVILLE, MARYLAND 20782EXHIBIT C  
(Corn)OBJECTIVE DESCRIPTION OF VARIETY  
CORN (ZEA MAYS)

6487-6493

NAME OF APPLICANT(S) Holden's Foundation Seeds, Inc.	FOR OFFICIAL USE ONLY
ADDRESS (Street and No. or R.F.D. No., City, State, and ZIP Code) R.R.#2, Box 839 Williamsburg, Iowa 52361	PVPO NUMBER 8700089
	VARIETY NAME OR TEMPORARY DESIGNATION LH146

Place the appropriate number that describes the varietal character of this variety in the boxes below.  
Place a zero in first box (e.g.,  or ) when number is either 99 or less or 9 or less.

## 1. TYPE:

1 = SWEET

2 = DENT

3 = FLINT

4 = FLOUR

5 = POP

6 = ORNAMENTAL

## 2. REGION WHERE BEST ADAPTED IN THE U.S.A.:

1, 2 

1 = NORTHWEST

2 = NORTHCENTRAL

3 = NORTHEAST

4 = SOUTHEAST

5 = SOUTHCENTRAL

6 = SOUTHWEST

7 = MOST REGIONS

## 3. MATURITY (In Region of Best Adaptability):

(Under "comments" (pg. 3) state how heat units were calculated)

DAYS FROM EMERGENCE TO 50% OF PLANTS IN SILK

HEAT UNITS

DAYS FROM 50% SILK TO OPTIMUM EDIBLE QUALITY

HEAT UNITS

DAYS FROM 50% SILK TO HARVEST AT 25% KERNEL MOISTURE

HEAT UNITS

## 4. PLANT:

CM. HEIGHT (To tassel tip)

CM. EAR HEIGHT (To base of top ear)

CM. LENGTH OF TOP EAR INTERNODE

## Number of Tillers:

1 = NONE

2 = 1-2

3 = 2-3

4 = &gt; 3

## Number of Ears Per Stalk:

1 = SINGLE

2 = SLIGHT TWO-EAR TENDENCY

3 = STRONG TWO-EAR TENDENCY 4 = THREE-EAR TENDENCY

## Cytoplasm Type:

1 = NORMAL

2 = "T"

3 = "S"

4 = "C"

5 = OTHER (Specify)

## 5. LEAF (Field Corn Inbred Examples Given):

5GY4/4 Munssell Color Charts for Plant Tissues

## Color:

1 = LIGHT GREEN (HY)

2 = MEDIUM GREEN (WF9)

3 = DARK GREEN (B14)

4 = VERY DARK GREEN (K166)

## Angle from Stalk (Upper half):

1 = &lt; 30°

2 = 30-60°

3 = &gt; 60°

## Sheath Pubescence:

1 = LIGHT (W22)

2 = MEDIUM (WF9)

3 = HEAVY (OH26)

## Marginal Waves:

1 = NONE (HY)

2 = FEW (WF9)

3 = MANY (OH7L)

## Longitudinal Creases:

1 = ABSENT (OH51)

2 = FEW (OH56A)

3 = MANY (PA11)

## Width:

CM. WIDEST POINT OF EAR NODE LEAF

## Length:

CM. EAR NODE LEAF

NUMBER OF LEAVES PER MATURE PLANT

## 6. TASSEL:

0 6

NUMBER OF LATERAL BRANCHES

Branch Angle from Central Spike:

2

1 =  $< 30^\circ$ 

2 = 30–40°

3 =  $> 45^\circ$ 

Penduncle Length:

1 3

CM. FROM TOP LEAF TO BASAL BRANCHES

Pollen Shed:

2

1 = LIGHT (WF9)

2 = MEDIUM

3 = HEAVY (KY21)

6

Anther Color:

1 = YELLOW

2 = PINK

3 = RED

4 = PURPLE

5 = GREEN

6

Glume Color:

6 = OTHER (Specify)

Pink &amp; yellow, green w/purple stripe

Pollen Restoration for Cytoplasms (0 = Not Tested, 1 = Partial, 2 = Good)

0

"T"

0

"S"

0

"C"

0

OTHER (Specify Cytoplasm and degrees of restoration)

## 7. EAR (Husked Ear Data Except When Stated Otherwise):

1 5

CM LENGTH

3 6

MM. MID-POINT  
DIAMETER

8 4

GM. WEIGHT

Kernel Rows:

2

1 = INDISTINCT

2 = DISTINCT

1 4

NUMBER

1

1 = STRAIGHT

2 = SLIGHTLY CURVED

3 = SPIRAL

Silk Color (Exposed at Silking Stage):

1

1 = GREEN

2 = PINK

3 = SALMON

4 = RED

Husk Color:

1

FRESH

1 = LIGHT GREEN

2 = DARK GREEN

3 = PINK

6

DRY

4 = RED

5 = PURPLE

6 = BUFF

Husk Extention: (Harvest Stage)

2

1 = SHORT (Ears Exposed) 2 = MEDIUM (Barely Covering Ear)

3 = LONG (8–10 CM Beyond Ear Tip)

4 = VERY LONG ( $> 10$  CM)

Husk Leaf:

1

1 = SHORT ( $< 8$  CM)

2 = MEDIUM (8–15 CM)

3 = LONG ( $> 15$  CM)

Shank:

1 5

CM LONG

6

NO. OF INTERNODES

Position at Dry Husk Stage:

3

1 = UPRIGHT

2 = HORIZONTAL

3 = PENDENT

Taper:

1

1 = SLIGHT

2 = AVERAGE

3 = EXTREME

Drying Time (Unhusked Ear):

2

1 = SLOW

2 = AVERAGE

3 = FAST

## 8. KERNEL (Dried):

Size (From Ear Mid-Point):

1 1

MM LONG

0 8

MM. WIDE

0 4

MM. THICK

Shape Grade (% Rounds)

3

1 =  $< 20$ 

2 = 20–40

3 = 40–60

4 = 60–80

5 =  $> 80$ 

7



## 8. KERNEL (Dried) :

Pericarp Color: 1 = COLORLESS 2 = RED-WHITE CROWN 3 = TAN 4 = BRONZE  
 5 = BROWN 6 = LIGHT RED 7 = CHERRY RED  
 8 = VARIEGATED (Describe) \_\_\_\_\_

Aleurone Color: 1 = HOMOZYGOUS 2 = SEGREGATING (Describe) \_\_\_\_\_

1 = WHITE 2 = PINK 3 = TAN 4 = BROWN 5 = BRONZE 6 = RED  
 7 = PURPLE 8 = PALE PURPLE 9 = VARIEGATED (Describe) \_\_\_\_\_

Endosperm Color: 1 = WHITE 2 = PALE YELLOW 3 = YELLOW 4 = PINK-ORANGE 5 = WHITE CAP.

## Endosperm Type:

1 = SWEET (su1) 2 = EXTRA SWEET (sh2) 3 = NORMAL STARCH 4 = HIGH AMYLOSE STARCH  
 5 = WAXY STARCH 6 = HIGH PROTEIN 7 = HIGH LYSINE 8 = OTHER (Specify) \_\_\_\_\_

GM. WEIGHT /100 SEEDS (Unsize Sample)

## 9. COB:

MM. DIAMETER AT MID-POINT

## Strength:

1 = WEAK 2 = STRONG

## Color:

1 = WHITE 2 = PINK 3 = RED 4 = BROWN  
 5 = VARIEGATED 6 OTHER (Specify) \_\_\_\_\_

## 10. DISEASE RESISTANCE (0 = Not Tested, 1 = Susceptible, 2 = Resistant):

<input type="text" value="0"/> STALK ROT (Diplodia)	<input type="text" value="0"/> STALK ROT (Fusarium)	<input type="text" value="0"/> STALK ROT (Gibberella)
<input type="text" value="2"/> NORTHERN LEAF BLIGHT	<input type="text" value="0"/> SOUTHERN LEAF BLIGHT	<input type="text" value="0"/> SMUT
<input type="text" value="0"/> SOUTHERN RUST	<input type="text" value="0"/> CORN SMUT	<input type="text" value="0"/> BACTERIAL WILT
<input type="text" value="0"/> BACTERIAL LEAF BLIGHT	<input type="text" value="0"/> MAIZE DWARF MOSAIC	<input type="text" value="0"/> STUNT
<input type="text" value="0"/> OTHER (Specify) _____		

## 11. INSECT RESISTANT (0 = Not Tested, 1 = Susceptible, 2 = Resistant):

<input type="text" value="0"/> CORNBORER	<input type="text" value="0"/> EARWORM	<input type="text" value="0"/> SAPBEETLE	<input type="text" value="0"/> APHID
<input type="text" value="0"/> ROOTWORM (Northern)	<input type="text" value="0"/> ROOTWORM (Western)		
<input type="text" value="0"/> ROOTWORM (Southern)	<input type="text" value="0"/> OTHER (Specify) _____		

## 12. VARIETIES MOST CLOSELY RESEMBLING THAT SUBMITTED FOR THE CHARACTERS GIVEN:

CHARACTER	VARIETY	CHARACTER	VARIETY
Maturity		Kernel Type	CM105
Plant Type	CM105	Quality (Edible)	
Ear Type	CM105	Usage	CM105

## REFERENCES:

- U.S. Department Agriculture. Yearbook 1937.  
 Corn: Culture, Processing, Products. 1970 Avi Publishing Company, Westport, Connecticut. (Numerous Authors)  
 Emerson, R.A., G.W. Beadle, and A.C. Fraser. A Summary of Linkage Studies in Maize. Cornell A.E.S., Mem. 180. 1935.  
 The Mutants of Maize. 1968. Crop Science Society of America. Madison, Wisconsin.  
 Stringfield, G.H. Maize Inbred Lines of Ohio. Ohio A.E.S. Bul. 831. 1959.  
 Butler, D.R. 1954 - A System for the Classification of Corn Inbred Lines - PhD. Thesis, Ohio State University.

## COMMENTS:

$$GDD = \frac{T_{max} + T_{min}}{2} - 50^{\circ}F$$

## Exhibit D

## Additional Description of Inbred

'LH146Ht' is similar to 'CM105', but has a different tassel. The tassel branch angle of 'LH146Ht' is wider than that of 'CM105'. 'LH146Ht' has a tassel branch angle of approximately  $45^{\circ}$  while the tassel branch angle of 'CM105' is approximately  $30^{\circ}$ . 'LH146Ht' also has more lateral tassel branches than does 'CM105'. On the average 'LH146Ht' has 6 lateral tassel branches compared to 3 for 'CM105'.

'LH146Ht' produces a chlorotic lesion for northern corn leaf blight race 1 Helminthosporium turcicum while 'CM105' does not.

'LH146Ht' has a longer shank than 'CM105' which makes for a long, showy ear.

'LH146Ht' reaches 50% pollen and 50% silk approximately 3 days later than 'CM105'.

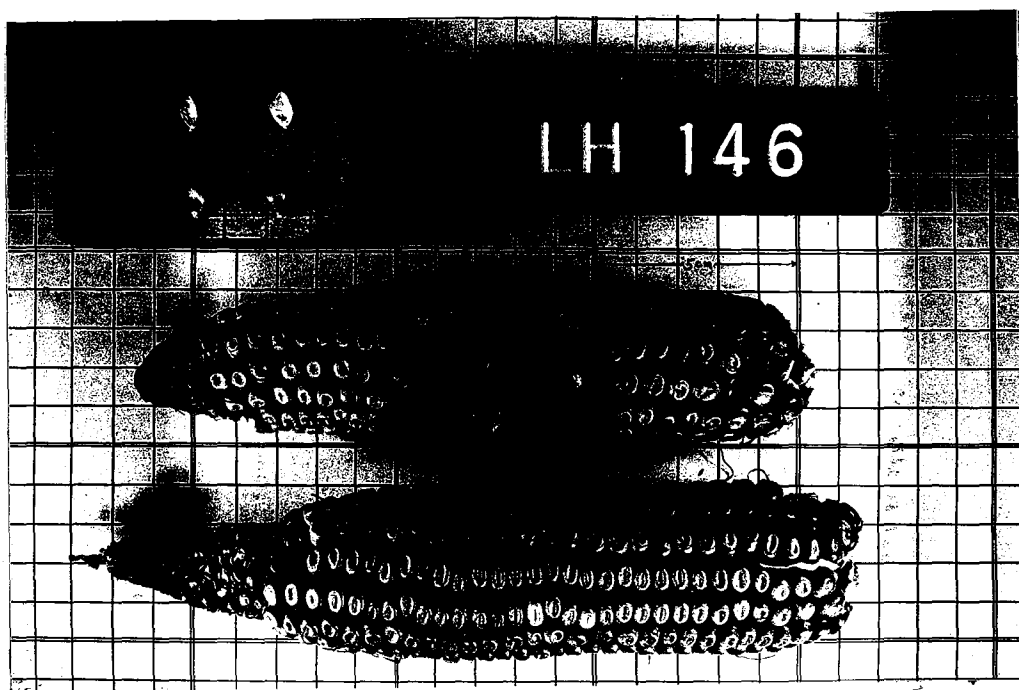
'LH146Ht' and 'CM105' are both similar in color. When using the Munsell Color Charts for Plant Tissues as a reference both inbreds would be classified as a 5GY 4/4. This classification is a dark green.

'LH146' is taller than 'CM105'.

The leaf angle at the upper part of the plant of 'LH146Ht' is more upright than that of 'CM105'. The leaf angle from the upper half of the stalk of 'LH146Ht' is  $30^{\circ}$ - $60^{\circ}$  and the leaf angle of 'CM105' is greater than  $60^{\circ}$ .



Whole Plant



Ear

Exhibit E

Statement of Applicant's Ownership

Holden's Foundation Seeds, Inc., Williamburg, Iowa believes it is the sole owner and breeder of the 'LH146Ht' field corn inbred for which it solicits a certificate of protection.